

What is claimed is:

1. A subscriber for indicating liveness to a broker in a multicast publish/subscribe messaging system comprising the broker and a plurality of subscribers, the subscriber comprising:

means, responsive to seeing an indication of liveness, for setting a timer;

means for cancelling the timer if the subscriber sees an indication of liveness prior to the expiry of the timer; and

means for sending, on expiry of the timer, an indication of liveness to the broker.

2. The subscriber of claim 1, wherein the means for sending an indication of liveness comprises:

means for multicasting a claim that the subscriber proposes to send an indication of its presence to the broker; and

means for sending a presence indication to the broker.

3. The subscriber of claim 2, wherein the indication of liveness responsive to which the timer is set is a claim.

4. The subscriber of claim 1, wherein the means for cancelling the timer comprises:

means for determining at least one of i) if a desired number of subscribers have indicated liveness and ii) that the broker is aware of the presence of at least one subscriber; and

means, responsive to determining that a desired number of subscribers have indicated liveness and/or that the

broker is aware of the presence of at least one subscriber, for cancelling the timer.

5. The subscriber of claim 4 comprising:

means for receiving and storing a max value, the max value being representative of the desired number of subscribers.

6. The subscriber of claim 1, wherein in operation an

10 active connection between the broker and the subscriber is maintained, the subscriber comprising:

means for using the active connection to send an indication of its presence to the broker.

15 7. The subscriber of claim 6, wherein the active

connection is a TCP connection.

8. The subscriber of claim 1, wherein the indication of liveness is piggybacked onto another message.

20 9. The subscriber of claim 1, wherein the indication of liveness is sent over one of:

a UDP connection; and

a TCP connection.

25 10. The subscriber of claim 1 comprising:

means for receiving an indication from the broker that the broker is aware of the presence of at least one subscriber.

30 11. A broker for liveness monitoring in a multicast publish/subscribe messaging system comprising a plurality of subscribers as claimed in claim 1, wherein the broker is

operable to maintain at least one active connection between the broker and at least one subscriber, the broker comprising:

means for determining which subscribers have an active connection to the broker; and

means for informing a subscriber that they should set a timer only if that subscriber has an active connection to the broker.

12. A broker for liveness monitoring in a multicast publish/subscribe messaging system comprising a plurality of subscribers as claimed in claim 1, wherein the broker is operable to maintain at least one active connection between the broker and at least one subscriber, the broker comprising:

means for determining which subscribers have an active connection to the broker; and

means for informing such active subscribers that their timer should run for less than a predetermined amount.

13. The broker of claim 11, the broker comprising:

means for designating as a primary subscriber the first subscriber to register interest in a topic; and means for maintaining an active connection to the primary subscriber.

14. The broker of claim 13 comprising:

means for, in the event of failure of the primary subscriber, designating as a new primary subscriber the subscriber whose indication of liveness is next received.

15. The broker of claim 13 comprising:

means for informing at least the primary subscriber that it is responsible for periodically indicating liveness to the broker.

5

16. A broker for liveness monitoring in a multicast publish/subscribe messaging system comprising a plurality of subscribers as claimed in claim 1, the broker comprising:

means for listening in on a multicast channel, used by the subscribers, in order to receive any indications of liveness from said subscribers.

17. A method for indicating liveness to a broker in a multicast publish/subscribe messaging system comprising the broker and a plurality of subscribers, the method comprising:

responsive to seeing an indication of liveness at a subscriber, setting a timer;

20 cancelling the timer if the subscriber sees an indication of liveness prior to the expiry of the timer; and

sending, on expiry of the timer, an indication of liveness to the broker.

25

18. The method of claim 17, wherein the step of sending an indication of liveness comprises:

multicasting a claim that the subscriber proposes to send an indication of its presence to the broker; and

30 sending a presence indication to the broker.

19. The method of claim 18, wherein the indication of liveness responsive to which the timer is set is a claim.

20. The method of claim 17, wherein the step of cancelling the timer comprises:

5 determining at least one of i) if a desired number of subscribers have indicated liveness and ii) that the broker is aware of the presence of at least one subscriber; and

10 responsive to determining that a desired number of subscribers have indicated liveness and/or that the broker is aware of the presence of at least one subscriber, cancelling the timer.

21. The method of claim 20 comprising the steps of:

15 receiving and storing a max value, the max value being representative of the desired number of subscribers.

22. The method of claim 17, wherein the broker is operable to maintain at least one active connection between itself and at least one subscriber, the method comprising:

20 using one such active connection to send an indication of a subscriber's presence broker.

25 23. The method of claim 22, wherein the active connection is a TCP connection.

24. The method of claim 17, wherein the indication of liveness is piggybacked onto another message.

25. The method of claim 17, wherein the indication of liveness is sent over one of:

30 a UDP connection; and
a TCP connection.

26. The method of claim 17 comprising:
receiving an indication from the broker that the
broker is aware of the presence of at least one subscriber.

5 27. A method for liveness monitoring in a multicast
publish/subscribe messaging system comprising a plurality
of subscribers as claimed in claim 1, wherein the broker is
operable to maintain at least one active connection between
the broker and at least one subscriber, the method
10 comprising:
determining which subscribers have an active
connection to the broker; and
informing a subscriber that they should set a timer
only if that subscriber has an active connection to the
15 broker.

20 28. A method for liveness monitoring in a multicast
publish/subscribe messaging system comprising a plurality
of subscribers as claimed in claim 1, wherein the broker is
operable to maintain at least one active connection between
the broker and at least one subscriber, the method
comprising:
determining which subscribers have an active
connection to the broker; and
25 informing such active subscribers that their timer
should be less than a predetermined amount.

30 29. The method of claim 27 comprising:
designating as a primary subscriber the first
subscriber to register interest in a topic; and
maintaining an active connection to the primary
subscriber.

30. The method of claim 29 comprising:

in the event of failure of the primary subscriber, designating as a new primary subscriber the subscriber whose indication of liveness is next received.

5

31. The method of claim 29 comprising:

informing at least the primary subscriber that it is responsible for periodically indicating liveness to the broker.

10

32. A method for liveness monitoring in a multicast publish/subscribe messaging system comprising a plurality of subscribers as claimed in claim 1, the method comprising:

15 listening in on a multicast channel, used by the subscribers, in order to receive any indications of liveness from said subscribers.

20 33. A computer program for indicating liveness to a broker in a multicast publish/subscribe messaging system comprising the broker and a plurality of subscribers, the computer program comprising program code means adapted to perform the steps of:

25 responsive to seeing an indication of liveness at a subscriber, setting a timer;

cancelling the timer if the subscriber sees an indication of liveness prior to the expiry of the timer; and

30 sending, on expiry of the timer, an indication of liveness to the broker.